

5 Oct 73
(DATE)

State Dept., USAF declassification & release instructions on file

MEMORANDUM FOR THE RECORD

SUBJECT: Opinion Request - *Chemical Catalysis (Subject III - Selected Catalytic Systems) - Record of Meeting - US-USSR 30 Aug 73 S&T Belab*

Attached is self-explanatory material from the Department of State. May we have your opinion by 15 Oct 73.

Please state degree of interest and whether we will receive requirements.

25X1A

[Redacted]
(ILLAGE)

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COMMENTS: *State hopes to supply US side with good background notes prior to the Nov 73 Jt. Commission Meeting. Please let me know whether to expect comments. Thanks*

Chemical Catalysis

DISTRIBUTION:

- OSI: -
- DEF: -
- IRS-Ellie -
- AF: - *no obj*
- NAVY: *no comments*
- ARMY: -
- DIA: -
- 655: -

25X1A

*genl reqs still OK
copies of all trip reports
by US types
cardinal assessments of
quality of Sov
catalytic ~~for~~ research
and likely benefits to
accrue to both
countries*

E2 IMPDET
CL BY: 007622

*Ans by
EKS-72-73
dtd 25 Oct 73
(attached)*

To the Co-Chairmen of the US-USSR Working Group on
Cooperation in the Field of Chemical Catalysis
August 30, 1973

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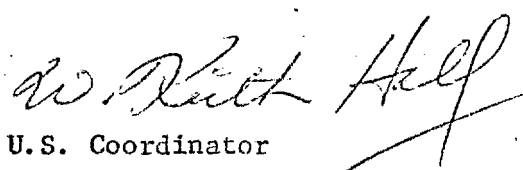
Report

The US and USSR Coordinators of the Joint Program on In-
Depth Study of Selected Catalyst Reactions (Theme III) herewith
transmit to the Co-Chairmen of the US-USSR Working Group on Co-
operation in the Field of Catalysis the Record of its meeting,
signed in Moscow August 30, 1973.

STATINTL

The Record, which is attached, describes the proceedings
of the meeting of participants in the Joint Program that was
held in Moscow August 27-30, 1973 and lists the topics and
projects approved and recommended for the implementation of
the program.

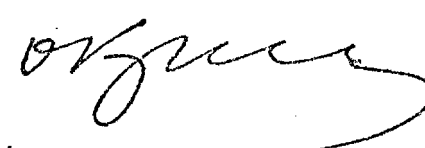
The Program Coordinators recommend approval of the proposed
priority projects so that cooperative work may begin at an early
date.


U.S. Coordinator

(W. Keith Hall)

U.S.S.R. Coordinator

(O. V. Krylov)



Record of Proceedings of the Soviet-American Meeting
on Theme Number 3 "In-Depth Study" of Selected Catalytic
Systems"

Moscow, USSR

August 30, 1973

In accordance with the inter-governmental Soviet-American Agreement on Cooperation in the Fields of Science and Technology, signed in Moscow May 24, 1972, and in agreement with the decisions of the meeting of the Mixed Soviet-American Commission held in Washington in March 19-21, 1973, a Soviet-American meeting on Theme Number 3 "In-Depth Study of Selected Catalytic Systems" was held in Moscow August 27-30, 1973.

The American participants in the meeting were: Coordinator for Theme III, Professor W. Keith Hall (University of Wisconsin), Professor J. Turkevich (Princeton University) and Professor G. W. Keulks (University of Wisconsin).

The Soviet participants were: Coordinator for Theme III, Professor O. V. Krylov; Corresponding Member of the USSR Academy of Science V. I. Goldanskii; Academician N. N. Semenov; candidate of Physical Mathematics Sciences J. P. Syzdalev; Professor L. Ya. Margolis; candidate of Chemical Sciences I. I. Tretyakov; candidate of Chemical Sciences B. R. Shub (Institute of Chemical Physics of the USSR Academy of Sciences); Academician G. K. Boreskov; Corresponding Member of the USSR Academy of Sciences M. G. Slinko (Institute of Catalysis of the Siberian Branch of the USSR Academy of Sciences); Corresponding Member of the USSR Academy of Sciences Kh. M. Minachev; Professor V. B. Kazanskii; Candidate of

Physical Mathematical Sciences G. M. Zhidomirov (Institute of Organic Chemistry of the USSR Academy of Sciences); Professor E. I. Klabunovskiy; (^{Organic Chemistry} Institute of ~~Chemical Physics~~ of the USSR Academy of Sciences); Candidate of Chemical Science V. S. Smirnov (Institute of Petro-Chemical Synthesis of the USSR Academy of Sciences); Professor V. M. Gryaznov, (Peoples' Friendship University); Professor K. V. Topchiyeva (Moscow State University); Academician of the Kazakh S.S.R. Academy of Sciences, D. V. Sokol'skiy (Institute of Organic Catalysis and Electrochemistry of the Kazakh S.S.R. Academy of Sciences); Corresponding Member of the Ukrainian S.S.R. Academy of Sciences, Ya. B. Gorokhovatskiy (Institute of Physical Chemistry of the Ukrainian S.S.R. Academy of Sciences); Professor T. G. Alkhazov (Azerbaijan Institute of Petroleum and Chemistry).

The following questions were discussed at the meeting:

1. Catalysis on metals.
2. Oxidation Catalysis on Oxides.
3. Acid-Base Catalysis.

In the course of the meeting, the Soviet side through their reports provided an opportunity for the American scientists to familiarize themselves with the range of research in the area of heterogeneous catalysis being conducted in the Institute of Chemical Physics of the USSR Academy of Sciences, the Institute of Organic Chemistry of the USSR Academy of Sciences, the Institute of Chemistry of the Siberian Branch of the USSR Academy of Sciences,

the Institute of Petrochemical Synthesis of the USSR Academy of Sciences, the University of Peoples' Friendship, the Moscow State University and the Institute of Organic Catalysis and Electrochemistry of the Kazakh S.S.R. Academy of Sciences that allowed them to more fully evaluate the volume and level of catalytic research being conducted in the USSR. American scientists visited laboratories of the Institute of Chemical Physics, Institute of Organic Chemistry of the USSR Academy of Sciences and the Institute of Catalysis of the Siberian Branch of the USSR Academy of Sciences.

On August 29 and 30, the American scientists delivered the following lectures at the Institute of Organic Chemistry and the Institute of Chemical Physics.

Professor W. K. Hall "Isomerization of Butenes on Zeolites".

Professor G.M. Keulks "Mechanism of Catalytic Oxidation
Using $^{18}\text{O}_2$ ".

Professor J. Turkevich "Synthesis, Characterization and
Catalytic Properties of Particles of Noble Metals".

The lectures of the American scientists enlarged the knowledge of the Soviet scientists on American research in the field of catalysis.

In accordance with previously agreed program for conducting joint research on Theme III, the following plan of joint work was adopted at the meeting (see appendix).

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Reciprocal trips and research visits by Soviet and American scientists, on the basis of equivalent exchange, are envisaged for the participation in carrying out of the joint scientific work. Specifically the meeting recommends that in 1973 several Soviet senior scientists should visit several U.S. centers that are active in heterogeneous catalysis. Further it recommends that three junior scientists from each side be sent for periods of about six months to work on agreed plans in the other country on the basis of equivalent exchange. This program should be completed in 1973-1974.

The members of the meeting note that the scientific and practical importance of heterogeneous catalysis^{is} rapidly rising and ^{recommend} consider that the extent of the joint effort be extended in the future by participation of a wider group of scientists and by increasing the number of visits by junior scientists.

For discussions of the scientific results achieved during the conduct of joint research on Theme III and additionally for the development of plans for further research, the meeting recommends that an American-Soviet working seminar be organized regularly, with the participation of scientists carrying out the joint work. The seminars hopefully would be conducted not less than once a year alternately in the US and the USSR.

The meeting considers it necessary in order to carry out the joint program of investigation to assure a steady exchange of catalyst samples and to establish a catalyst bank.

For better familiarization of the Soviet and American researchers with the work in the field of catalysis, the meeting considers it useful to recommend the publication of Soviet articles in American scientific journals and articles of American scientists in Soviet journals.

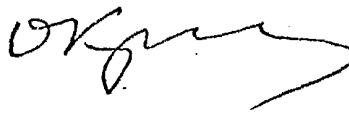


Coordinator for Theme Number 3 from the U.S.A.

Professor W. Keith Hall

Coordinator for Theme Number 3 from the U.S.S.R.

Professor O. V. Krilov



American-Soviet Investigation on Theme Number 3

"Study In-Depth of Selected Catalytic Systems"st

Moscow, USSR

I. Goals

Investigation of the In-Depth Study of Catalysis on simple catalysts and model reactions with participation of a wide circle of new physical methods which are available to both sides.

II. Questions which will be studied in 1973-74.

A. Catalysis on Metals and Alloys.

Primary Goals

1. Investigations of simple reactions of hydrogenation on planes of single crystals of platinum, nickel and its alloys using methods of low energy electron diffraction, auger spectroscopy, mass spectroscopy of surface ions, work function and electron and ion field emission.

Responsible for U.S.A.

Professor J. Turkevich

Responsible for USSR

Academician G. K. Boreskov

Candidate B. I. Savchenko

Candidate I. I. Tret'yakov

Candidate B. R. Shub

2. Preparation of membrane catalysts, having on their surface monodisperse particles of metals and alloys and the study on these catalysts of the hydrogenation.

Responsible for U.S.A.

Professor J. Turkevich

Responsible for U.S.S.R.

Professor V. M. Gryaznov

Candidate V. S. Smirnov

3. Preparation of monodisperse small particles of metals and alloys and investigation of their physico-chemical properties, catalytic activity and selectivity in the hydrogenation reactions.

Responsible for U.S.A.

Professor J. Turkevich

Responsible for U.S.S.R.

Academician D. V. Sokol'skiy

Kazakh Academy of Sciences

Note: Samples of colloidal catalysts will be made available by Professor J. Turkevich (Princeton University, USA). Investigations of catalytic activity and electrochemical characterization of the catalyst samples by Professor D. V. Sokol'skiy (Institute of Organic Catalysis and Electrochemistry of the Academy of Sciences of the Kazakh SSR.)

Future
Projects for Further Study

1. Investigation of the chemisorption and turn-over number of reactions on monodisperse particles of different size.

Responsible for USA.

Professor M. Boudart

Responsible for USSR

Academician G. K. Boreskov

2. Study of massive and highly dispersed metals and alloys by mossbauer spectroscopic methods.

Responsible for USA

Professor M. Boudart

Responsible for USSR

Corresponding Member

V. I. Goldanskiy

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3. Asymmetric hydrogenation for production of optically

active aminoacids.

Responsible for USA

Responsible for USSR

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Professor ~~F.~~ M. Klabunovskiy

4. Investigation of oxidation catalysis on metals.

Responsible for USA

, Responsible for USSR

Professor W. K. Hall

Academician G. K. Boreskov

Oxidation Catalysis on Oxides

1. Study of the mechanism of the action of molybdenum^{etc} catalysts and the influence of their composition on the catalytic activity and selectivity (variation of the nature of the cation, ratio of cation and molybdenum oxide, and phases). Investigation of the reaction of partial oxidation of propylene, oxidative dehydrogenation of butylene, oxidation of methyl alcohol and acrolein.

Methods of study: optical spectroscopy, microcalorimetry, radiospectroscopy, mossbauer spectroscopy, ESCA, tagged atoms.

Note: It is proposed to exchange samples of pure bismuth, molybdenum (alpha, gamma) and likewise molybdenum^{etc} Ni, Co, Fe, Mg, Al.

Responsible for USA

Responsible for USSR

Professor G. W. Keulks

Academician G. K. Boreskov

Professor O. V. Krjlov

Corresponding Member Academy of

Sciences Ukrainian SSSR Yq. B.

Gorokhovatski

Professor V. B. Kazanskij

Professor T. G. Alkhozov

Topics for Future Cooperation

1. Study of the influence of the anions-vanadates, phosphates, antimonates.

Responsible for USA

-- G.W. Keulks

Responsible for USSR

Professor O. V. Krylov

Professor T. G. Alkhazov

2. Study of molybdates with mixed cations.

Responsible for USA

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Responsible for USSR

Academician G. K. Borekov

3. Investigation of direct and inverse spinels with different ratios of cations (principally ferrites).

Responsible for USA

Professor G.W. Keulks

Responsible for USSR

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4. Use of photocatalysis as method of investigation of mechanism of oxidative catalysis.

Responsible for USA

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Responsible for USSR

Professor V. B. Kazanskiy

Acid-Base Catalysis

Primary Topic

1. Study of the mechanism of the action of acid catalysts in the isomerization reaction of butenes by kinetic methods, quantum chemistry, tagged atoms, optical and microwave spectroscopy.

Responsible for USA

Professor W. K. Hall

Responsible for USSR

Professor K. V. Topchieva

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Corresponding Member Academy
of Sciences

Kh. M. Minachev

Academician G. K. Boreskov

Professor V. B. Kazanski

Candidate G. M. Zhidomirov

Note: It is envisaged that samples of catalysts will be
exchanged of acid type (zeolites with different cations) and
base type (Al_2O_3 , ZnO , MgO).

Topics for Future Study

1. Development of methods of investigating acidity.

Responsible for USA

Professor W. K. Hall

Responsible for USSR

Academician G. K. Boreskov

Professor K. V. Topchieva

USAF POSITION ON COMMUNIST BLOC VISITORS

Visitors: Chemical Catalysis

Project and Sponsor:

LGZ	AFSC	FTD	Other
N/O	N/O	N/O	

8. USAF also provides the following:

Opinion # 74-3 Due 18 Oct 73

Passed to IIAGE 23 Oct 73

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EXEMPT FROM GENERAL DECLASSIFICATION
SCHEDULE OF EXECUTIVE ORDER 11652
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EXS-72-73
25 October 1973

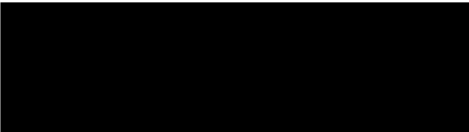
MEMORANDUM FOR: Mr. Sol Polansky
Acting Director, Office of Soviet and
Eastern European Exchanges
Department of State

ATTN : Mr. Raymond Pardon

SUBJECT : US-USSR Cooperation in Chemical Catalysis under
the Soviet-American Meeting on Theme Number 3
"In-Depth Study of Selected Catalytic Systems"
dated 30 August 1973

We feel that this project is progressing evenly and are most interested in any trip reports resulting from US visits to the USSR. We hope that the US participants will make candid assessments of the quality of Soviet Catalytic research and likely benefits to accrue to the US. Such information is needed to judge the mutual advantages to both sides in this subject.

25X1A


Acting Chairman
Interagency Intelligence Advisory
Group on Exchanges

UMP
EAB/mn

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SCHEDULE OF E. O. 11652, EXEMPTION CATEGORY:
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